

1/3/18

"Some are born to greatness, some achieve greatness, and some have greatness thrust upon them"
- William Shakespeare

HW: "Introduction to Functions" finish the packet
Test 3 on Friday 1/12

AIM: What is a function?

Warm Up:

- 1) Solve, and express the answer in set builder, and interval notation: $x^2 - 13x > 48$

$$x^2 - 13x - 48 > 0$$
 (Note: open circles at -3 and 16, with arrows pointing away from each other. The word "GOLI" is written below the number line.)

$$\begin{array}{r} (x-16)(x+3) \\ \hline 16 \quad -3 \end{array}$$

$$\underline{SB}: \{x \mid x < -3 \text{ or } 16 < x\}$$

$$\underline{Int}: (-\infty, -3) \cup (16, \infty)$$

1) A relation is a set of unique ordered pairs. Here are a few examples:

$\{(1, 5) (3, 2) (8, 8) (1, 4) (7, 19.4)\}$

$\{(1, a) (2, b) (3, c) (4, d) (5, e)\}$

$\{(3.2, -90) (\text{pizza}, 435) (-2.9, \text{dishwasher}) (a, A)\}$

$\{(0, 0)\}$

2) A function is a special relation where the x-values **do not repeat**. Determine whether each of the following is a function:

✓ $\{(A, 1) (B, 2) (C, 3) (D, 4) (E, 5)\}$

✓ $\{(9, 0.2) (33, -77) (4, -2) (0, 0) (8, 9)\}$

✓ $\{(1, 3) (2, 3) (9, 3) (-12, 3) (b, 3)\}$

✗ $\{(0.2, -67) (3, h) (\text{red}, 5) (23, 9.1) (0.2, 55)\}$

3) There are **several ways** to describe/think about functions.

a] A function is a special relation whose x-values do not repeat, but the y values can repeat.

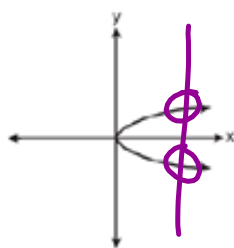
b] A function is a rule which assigns every x value **one, and only one** y value.

c] The graph of a function will pass the "vertical line test".

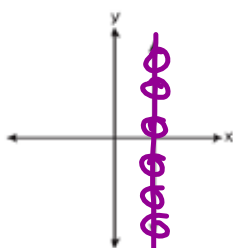
What is the vertical line test?

4) The Vertical Line Test: Since the x values are not allowed to repeat, no vertical line should ever hit the graph of a function more than once.

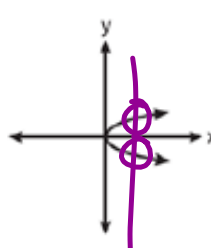
*5) Determine whether each of the following represents a function:



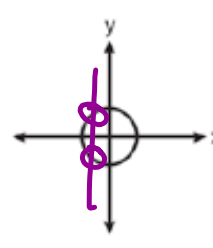
(1)
No!



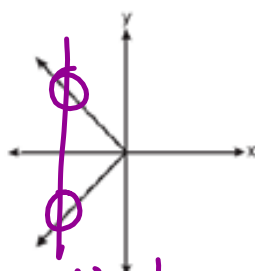
(3)
No!



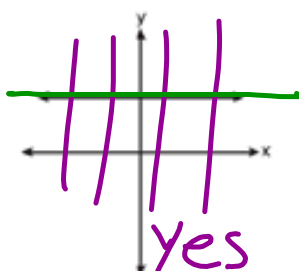
(1)
No!



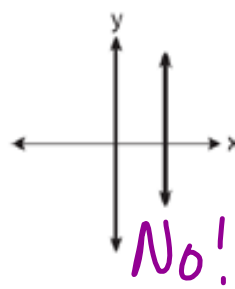
(3)
No!



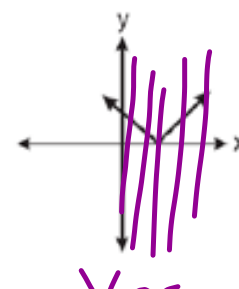
No!



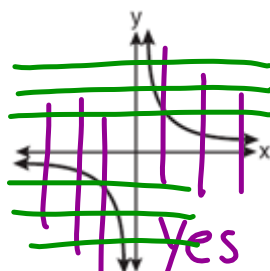
Yes



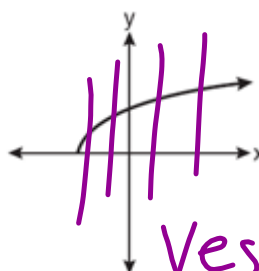
No!



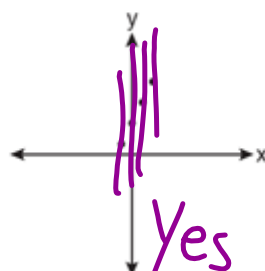
Yes



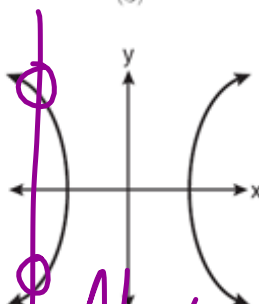
(1)
Yes



(3)
Yes



(2)
Yes



(4)
No!

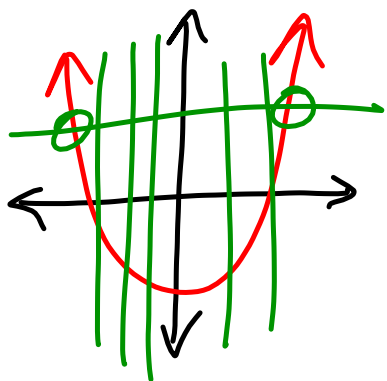
6) A function is called one-to-one if its y values **do not repeat**.

*That means that a **one-to-one** function has no repeating X or Y values.

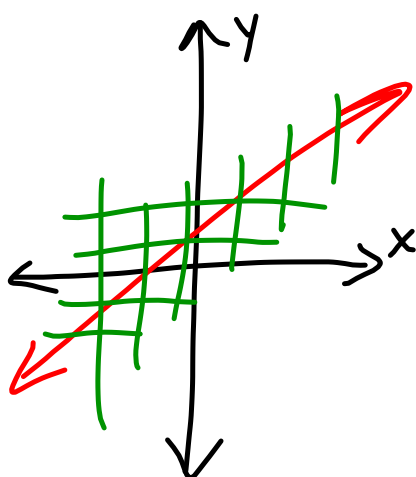
*That means that a **one-to-one** function will pass both the vertical line test,

and the horizontal line test.

7) Determine whether each of the following functions is **one-to-one**:



Not 1 to 1



Yes 1 to 1

- ~~8)~~ A function is called onto if it uses every y value that it is entitled to.
- ~~9)~~ Determine whether each of the following functions is **onto**:

10) Can you summarize the main points from today?

A] A relation is a set of unique ordered pairs.

B] A function is a relation whose X values do not repeat.

Functions pass the V.L.T. test.

C] A function is one-to-one if its Y values do not repeat.

One-to-one functions also pass the H.L.T. test.

~~D]~~ A function is called onto if it uses all of the y values that it can.